



**"Investing in Africa's  
Future"**

**FACULTY OF  
MANAGEMENT**

**COURSE TITLE: MMS402 - Production and Operations Management**

**SEMESTER 1: Final Examination September 2014**

**LECTURER: Dr. S. Murairwa**

**TIME: 3 Hours**

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### ***INSTRUCTIONS***

*Answer **all** Questions in Section A and **any three** questions in Section B.*

*Start **each** question on a new page in your answer booklet.*

*The marks allocated to **each** question are shown at the end of the section.*

*Show **all** your workings.*

*Credit will be given for logical, systematic and neat presentations.*

## SETION A: ANSWER ALL QUESTIONS

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1. Given the following layouts:

- Process
- Job-shop
- Flow-shop
- Functional
- Fixed position
- Line
- Combined
- Grouped
- Product

Which form of layout will you choose for the production system?

a) Air Craft manufacturing

[2 Marks]

b) AB University

[4 Marks]

c) Moyo Cement company  
Marks]

[3

d) Gudo bank

[4 Marks]

e) Kamba automobile

[5 Marks]

f) Mbare Flyover

[2 Marks]

2. Given the following graph:



a) Use the appropriate technique to determine the position for constructing the warehouse

[4

Marks]

b) With the additional information given below, determine the site for constructing the new warehouse. State four advantages of the technique you used

[10 Marks]

Potential Sites		
Site	X	Y
1	360	180
2	420	450
3	250	400

3. State and explain the functions of the operations manager in the production system [6 Marks]

### SECTION B: ANSWER ANY THREE QUESTIONS

4. MamaMia's Pizza is a small family oriented restaurant located at Rancho House College. Like any other business, MamaMia has three major management concerns.
- Identify MamaMia's business customers and processes [3 Marks]
  - Explain in detail why Productions/Operations Management is necessary taking into consideration MamaMia's business challenges. [4 Marks]
  - Analyse the strengths and weaknesses of MamaMia's business. Explain how MamaMia should translate the strengths and weaknesses into action [8 Marks]
  - What are the four major secondary factor based on which MamaMia's business location decision was based? [5 Marks]
5. A computer software firm has experienced the following demand for its "Personal Finance" software package for the first eight days of August 2014:

56    61    55    70    66    65    72    75

- Show that the forecast for the next period is the same as the forecast for the current period [2 Marks]
- Develop an exponential smoothing model and forecast the demand for period 9 [6 Marks]

**Marks]**

- Explain how a materials requirement planning system works [5 Marks]
- Using a product of your choice, briefly examine the content and purpose of the design process [7 Marks]

6. A glass factory specializing in crystal is experiencing a substantial backlog, and the firm's management is considering three courses of action: arrange for subcontracting (A), construct new facilities (B) and do nothing (C). The correct choice depends largely upon demand, which may be low, medium or high. By consensus, the management estimates the respective demand probabilities as 0.1, 0.5 and 0.4. The management also estimates the profits when choosing from the three alternatives (A, B, and C) under the differing probable levels of demand. These profits, in dollars are presented in the table below:

	Demand probability	0.1	0.5	0.4
	Demand pattern	Low	Medium	High
Course of action	A	10	50	90
	B	-120	25	200
	C	20	40	60

- a) Which course of action should the company take? **[5 Marks]**
- b) Why do we use labour input for partial productivity measurement? With examples, state and explain the possible measures of productivity **[7 Marks]**
- c) The factory used 500 labour hours to produce 12 000 sweets and sold each at \$10. The salary was calculated at \$9 per hour. The costs of raw and purchased materials are \$6 000 and \$20 000 respectively.
  - i) Determine the labour productivity **[4 Marks]**
  - ii) State the use of the productive measures and calculate two partial productivity measures **[4 Marks]**

7. Mr Albert Mukusha's company produces blankets for selling.

- a) The company sells a blanket for \$10. It costs \$5 to produce a blanket and has a fixed cost of \$25 000 per year.
  - i) How many blankets should the company sell to break-even? **[2 Marks]**
  - ii) How many blankets should the company sell to raise \$1000? **[2 Marks]**
  - iii) Explain the costs associated with producing a quality blanket **[5 Marks]**
- b) The company estimated the annual demand of one thousand blankets, an annual carrying cost of \$0.65 per blanket and the ordering cost of \$130 per order.
  - i) Minimise the company's total cost **[3 Marks]**
  - ii) Calculate the optimum order quantity, total cost, number of orders per year and order cycle time **[8 Marks]**

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**End of paper**

## Additional information

1: Capacity Utilisation	Capacity utilization rate = $\frac{\text{Capacity used}}{\text{Best operating level}}$
2: Moving Average	$MA_n = \frac{\sum_{i=1}^n D_i}{n}$
3: Weighted Moving Average	$WMA_n = \frac{\sum_{i=1}^n W_i D_i}{n}$
4: Smoothing Model	$F_{t+1} = \alpha D_t + (1 - \alpha) F_t$
5: Adjusted Smoothing Model	$AF_{t+1} = F_{t+1} + T_{t+1}$
6	$T_{t+1} = \beta (F_{t+1} - F_t) + (1 - \beta) T_t$
7: Linear Model	$y = a + b x$  $b = \frac{\sum xy - n\bar{x}\bar{y}}{\sum x^2 - n\bar{x}^2}$  $a = \bar{y} - b\bar{x}$
8: Productivity Measure	Productivity = $\frac{\text{Outputs}}{\text{Inputs}}$
9: Equation	$y = VC(Q) + FC$
10: Total Cost	$TC = \frac{Q}{2} C_h + \frac{D}{Q} C_o + DC$
11: Location Factor Rating	$LFR = \text{Max} \left\{ \sum_{i=1}^n W_i S_{1i}; \sum_{i=1}^n W_i S_{2i}; \dots \dots \dots; \sum_{i=1}^n W_i S_{ni} \right\}$
12: Centre of Gravity	$x = \frac{\sum_{i=1}^n x_i W_i}{\sum_{i=1}^n W_i}, \quad y = \frac{\sum_{i=1}^n y_i W_i}{\sum_{i=1}^n W_i}$
13: Load Distance	$LD = \sum_{i=1}^n l_i d_i$  $d_i = \sqrt{(x_i - x)^2 + (y_i - y)^2}$
14	
15	